

# The Marconi Archives

by R. RODWELL,  
GEC-Marconi Ltd.

GEC-Marconi Ltd. has a history going back to 1897 when, on 20th July of that year, the Wireless Telegraph and Signal Company Limited was formed. The objectives of this company were to develop Guglielmo Marconi's wireless apparatus and to exploit it commercially. Since that time, the Company has grown and developed, with the formation of many subsidiaries; these are now widespread across the British Isles, as well as overseas.

At the GEC-Marconi Research Centre, Great Baddow, reside the Marconi archives, which are shown in fig. 1. These date from 1895 and contain information concerning the early experiments of Marconi and his engineers throughout the world. A collection of press cuttings, dating from 1897, reveals how these successes were reported in the world's newspapers and journals (see fig. 2).

In addition to the written and printed matter – including photographs such as fig. 3, there is a collection of Marconi artefacts and apparatus, much of which formed the basis of early wireless communication. The purpose of this article is to review briefly some of the items in the collection, and to place them in the context of the Company's evolution. This paper does not attempt to give a full history. The bibliography at the end should help those looking for a more complete story.

## The Early Days of Wireless Telegraphy

Marconi came to England from Italy at the age of 22 early in 1896, bringing with him the wireless apparatus which he hoped to exploit – the world's first patent for a system of telegraphy using Hertzian (radio) waves was granted to Marconi on 2nd June 1896. Marconi's ambition was to provide a means of ship-to-shore communication for the mariner. At that time Britain possessed the world's largest mercantile fleet and the mightiest navy. With wireless installations on ships and in shore stations, no ship would be out of touch with other vessels, or with its company office.

R. Rodwell was educated at Cambridgeshire Technical College and School of Art, and the Mid-Essex Technical College where he studied Mechanical and Electrical Engineering. After a number of years as engineering buyer's assistant he joined the Centimetric Development Group of Marconi's Wireless Telegraph Company as a draughtsman. This was followed by work as a spares engineer in the Marconi Communication and Marconi Radar Systems Companies. In 1979 he transferred to the Publicity Unit of GEC-Marconi as a technical writer working on the design and production of sales literature. Currently his main task is that of company archivist.



1 The Marconi Archives

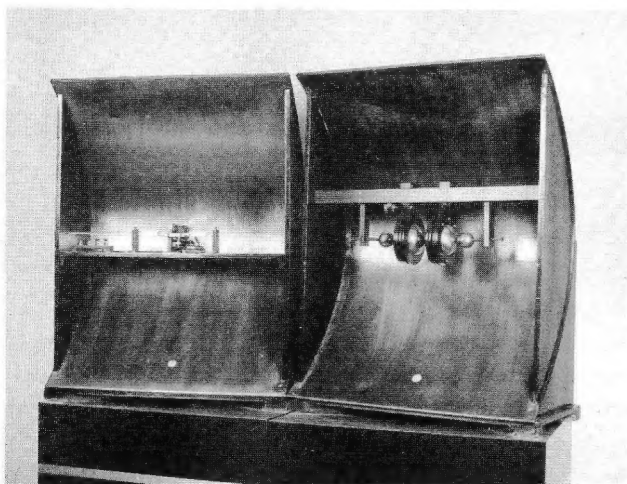


2 Newspaper cuttings describing the loss of the 'Titanic'





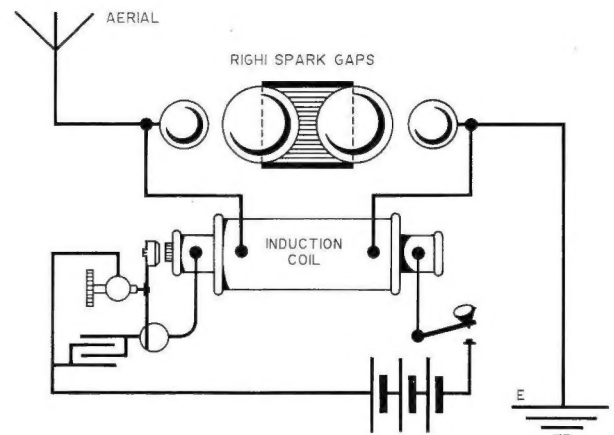
3 Guglielmo Marconi, 1874 – 1937



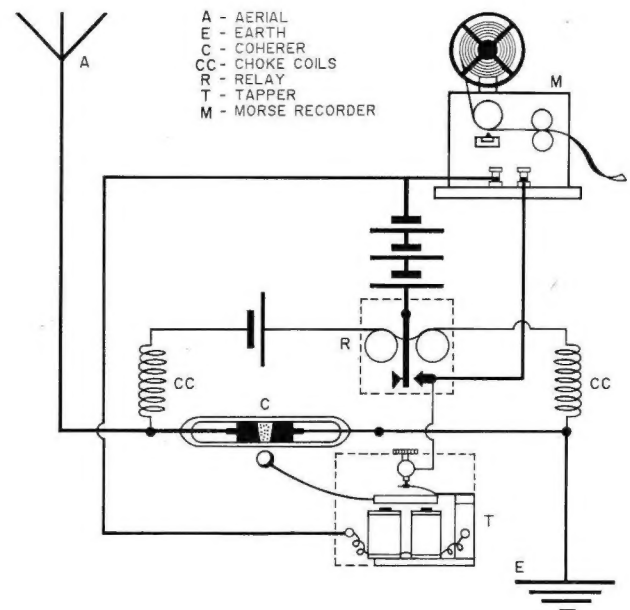
4 Transmitting apparatus (right) and receiving apparatus using parabolic reflectors

Fig. 4 shows replicas of Marconi's early apparatus using parabolic reflectors for the transmission and reception of wireless telegraphy. It was with such apparatus that he demonstrated the possibilities of 'beam' transmission and reception, in Italy in 1895.

The transmitter (fig. 5a) consists of a Righi oscillator, producing very short waves of the order of 25



a)



b)

5 a) Marconi's first transmitter circuit and b) his first receiving circuit

centimetres in length, placed in the focal line of a parabolic copper reflector. The outside spheres are connected to a Ruhmkorff induction coil, and sparks – controlled by a Morse key (not shown) – feed the oscillator. The two large spheres form a Hertzian oscillator, and their dimensions control the length of the wave emitted. The receiver (fig. 5b) – a Marconi 'coherer' – is positioned in the focal line of the transmitter reflector. The coherer – a device for detecting electromagnetic waves – was developed by Marconi, having been based upon a preliminary design by Edouard Branly, a French physicist.



When the Morse key is pressed, sparks pass between the spheres of the Righi oscillator; loose metal filings in the coherer unite and become conductive, thus permitting a weak current to pass through the device. Following each signal a tapper lightly hits the coherer, causing the filings to separate and the device to become non-conductive again. The tapper then ceases to function, leaving the coherer ready for the next signal.

When the coherer is in circuit with the other components of the receiver, a Morse code message from a transmitter can be heard in the receiver operator's headphones. An ink-writer is also activated, and this registers – on paper tape – a dot or dash, according to the incoming signal, thus providing a permanent record of the transmission..

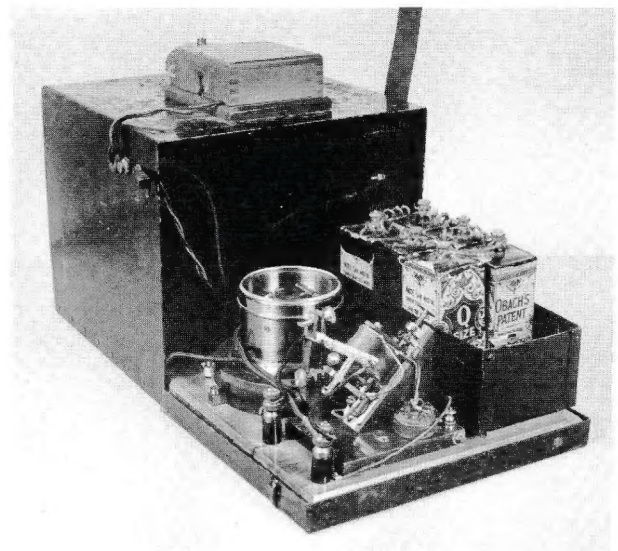
Marconi and his assistants gave many demonstrations of his apparatus. The first of these was given to the Chief Engineer of the British Post Office on the roof of the Post Office building in London. Further demonstrations were given before officials of the Post Office, and representatives of the navy and army, on Salisbury Plain in 1896 (1.75 miles) – using parabolic aerials – and, later, across the Bristol Channel (8 miles), with elevated aerials. As the apparatus was improved, so the distance of communication became greater.

Fig. 6 shows an early Marconi receiver. It is powered by six dry-cell batteries and incorporates a coherer. The receiver was usually connected to an ink-writer.

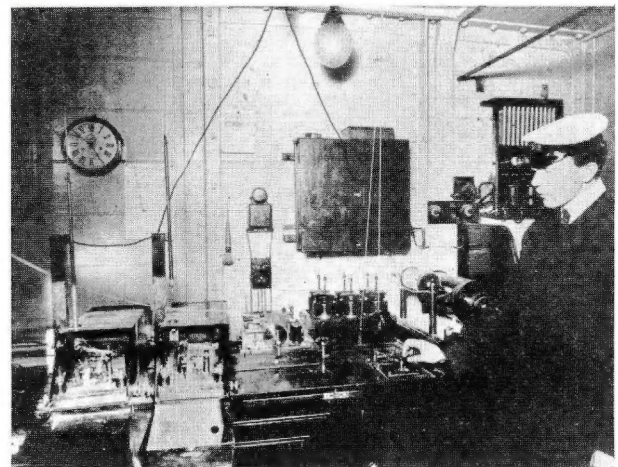
In December 1898 Marconi established at Hall Street in Chelmsford the first factory in the world for making wireless apparatus. The first large order was placed – on 4th July 1900 – by the British Admiralty for the supply and installation of wireless apparatus on board 26 naval vessels, and at six Admiralty coastal stations. This was the result of successful trials on Royal Navy ships during manoeuvres in the summer of 1899.

In the early 1900s ships were increasingly fitted with wireless (see fig. 7), shore stations were established, and the fear of vessels being cut off from the rest of civilization diminished.

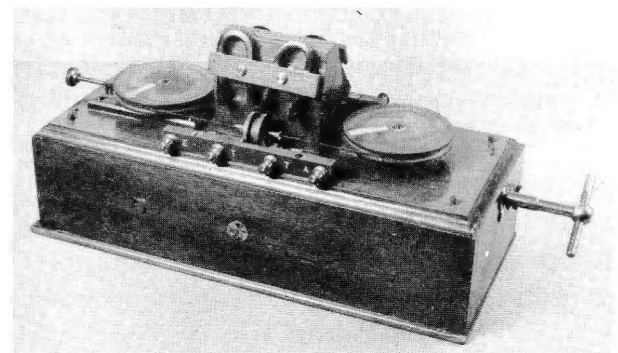
The magnetic detector (fig. 8), a receiving device that superseded the coherer receiver, was introduced in 1902 and, together with the multiple tuner (fig. 9), was the standard receiving apparatus fitted on ships and shore wireless stations until 1918. By then the rotary spark transmitter was in use. This type of apparatus was fitted on the ill-fated Titanic. Distress signals sent by the two Marconi operators on this ship summoned help from other wireless-equipped vessels. Without this facility the enormity of the disaster would have been even greater.



6 A 'coherer' receiver of 1897

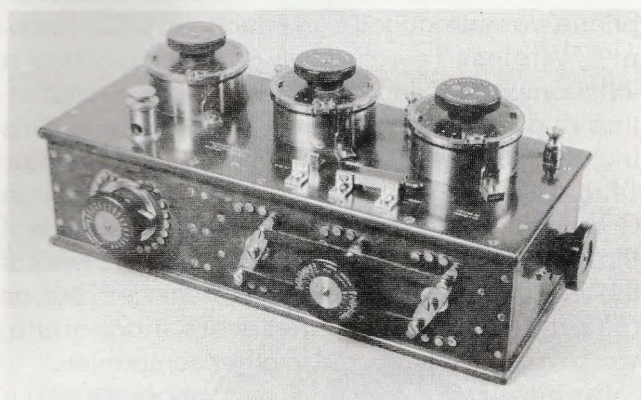


7 Typical ship's wireless cabin c.1900



8 Magnetic detector, c.1902





9 Multiple tuner, c.1907

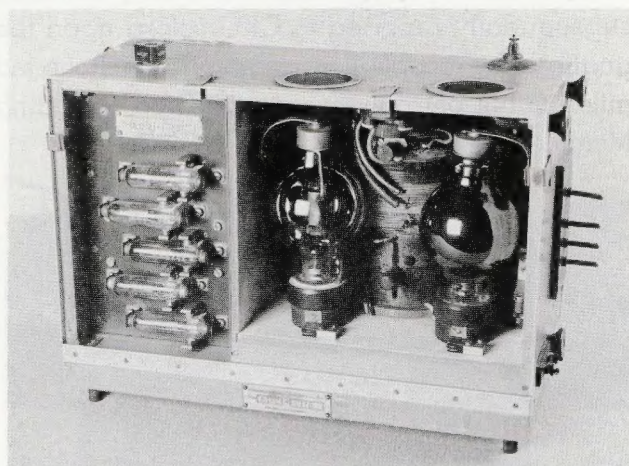
## Airborne Radio Communication

At the end of World War One many allied combat aircraft carried a small spark transmitter as means of communication. These sets were manufactured by government factories and other companies, one of them being the Marconi Company. Experiments were also carried out with wireless telephony apparatus, which eventually superseded telegraphy.

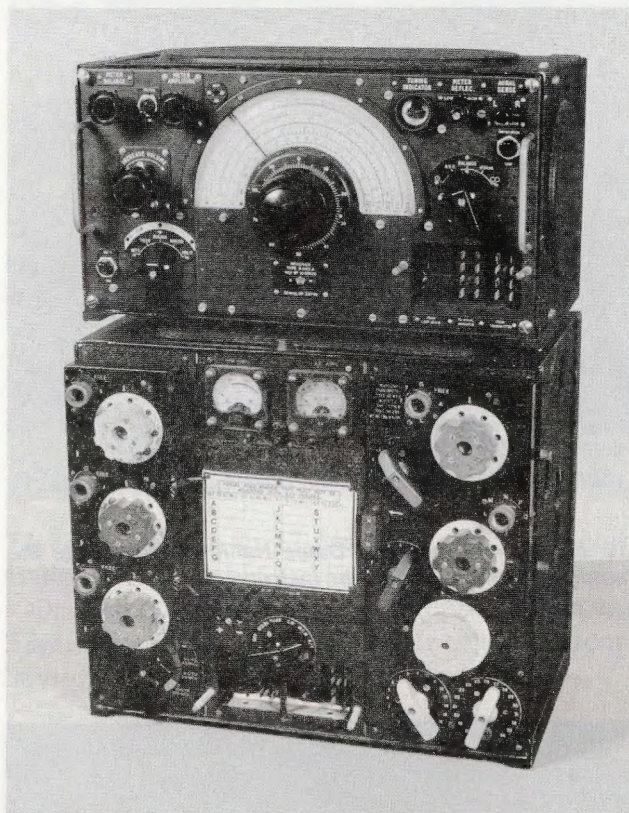
As the commercial aircraft industry became established and airline companies were formed, the need for reliable communication equipment increased. In response to this expanding market, the Marconi Company formed an aircraft department, and an example of one of their designs is shown in fig. 10.

The famous bomber aircraft transmitter and receiver, the T1154/R1155 of World War II, are shown in fig. 11. Over 80,000 of these units were made by The Marconi Company (and four other companies) during the war.

The T1154/R1155 system was a development from units designed and produced by the Marconi Company for Imperial Airways, prior to the second World War. The specifications for the new units were given to the Company in October 1939 and, by January 1940, models were flown and approved. Production equipments were fitted in aircraft of Bomber Command five months later, in June 1940. This was a notable achievement for all who worked on this project. Prominent amongst those working on this equipment was Sir Christopher Cockerell – later of hovercraft fame – who was a senior engineer with The Marconi Company at that time. All bomber aircraft of the British and Commonwealth forces were subsequently fitted with these units.



10 Aircraft receiver, model AD2, of 1921



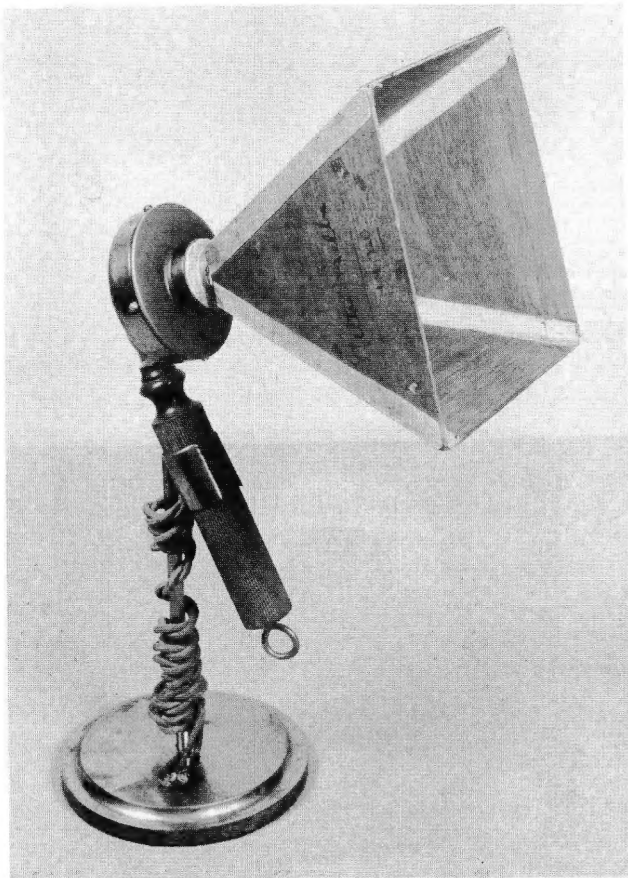
11 Transmitter and receiver units, T1154/R1155, of 1940

## Public Broadcasting

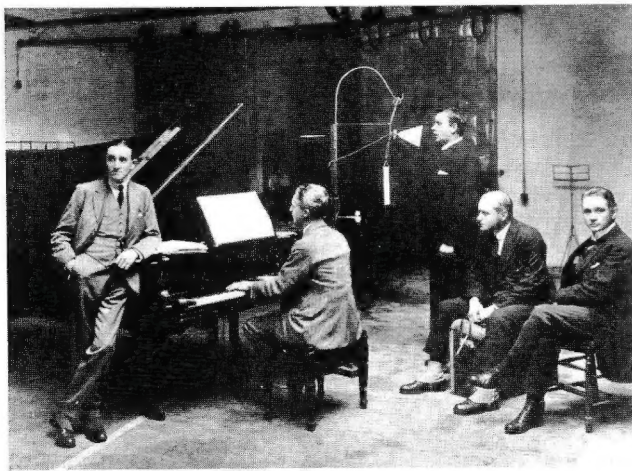
The age of broadcasting in Great Britain began in 1920. After engineers at The Marconi works had designed transmitters and made speech broadcasts, Chelmsford concert party performers were invited to take part in these transmissions. Whilst on 15th June 1920, Dame Nellie Melba, the Australian opera singer, made the first advertized broadcast from the Marconi works Chelmsford.



This had been arranged by and advertized in the Daily Mail newspaper (fig. 12). Many listeners subsequently reported to Chelmsford upon the quality of the reception at ranges of a few thousand miles. Other performers soon followed, including Melchior, the Danish tenor (fig. 13).



**12** Microphone used by Dame Nellie Melba – note the autograph on the side of the instrument



**13** The Danish tenor Lauritz Melchior broadcasting from the Marconi Works, Chelmsford, in July 1920

## Marconiphone

Two years after this event the name Marconiphone was introduced to the public. In 1922 Marconi's Wireless Telegraph Company created a 'Marconiphone' department to design, manufacture and sell domestic receiving apparatus. This included crystal sets and valve receivers (see figs. 14 and 15). In December 1923 the Marconiphone Company was formed to take over the activities of the Marconiphone department. The design work of the receivers was carried out at Chelmsford but, as the production capabilities were inadequate, work was sub-contracted to other companies.

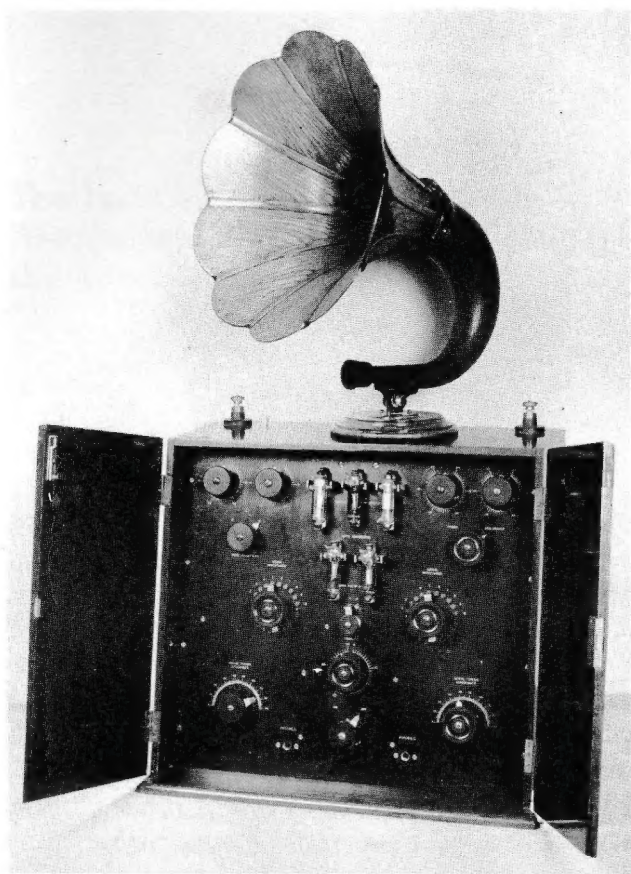
During an examination of the company's policy and methods in 1929, it was decided to sell the Marconiphone Company. This was done and, on 31st December 1929, it became part of the Gramophone Company. The purchaser had the right to use the trade mark 'Marconiphone' and the copyright signature 'G. Marconi' on domestic receivers. Marconi's Wireless Telegraph Company was precluded from trading in domestic receivers for a period of twenty years. In fact, since this date, Marconi has not re-entered the domestic market.

The Gramophone Company became EMI (Electric and Musical Industries) in 1931. This company produced domestic radios and, later, television receivers using the Marconiphone trademark until 1956, when receivers were made by the British Radio Corporation, under licence. From 1st April



**14** Wireless receiver model V2A of 1922





**15 Wireless receiver and loudspeaker c.1925**

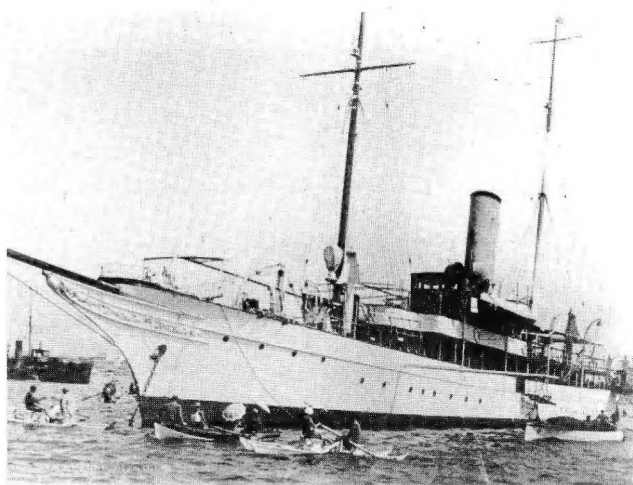
1973, British Radio Corporation became part of the THORN Group of Companies. Many domestic receivers – bearing the Marconiphone trademark – were therefore made after 1929 but these units had nothing to do with The Marconi Company.

In 1979 the trademarks 'Marconiphone' and 'G. Marconi' were re-acquired by the Marconi Company. 'Marconiphone' is now used by Marconi Communications Systems Ltd. for products in the field of cellular telephones, and paging equipment.

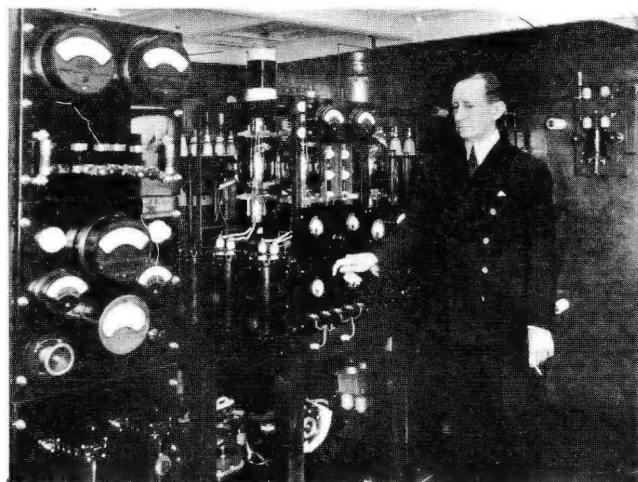
However, queries are still received today about those early receivers that bear the 'Marconiphone' and 'G. Marconi' trademark.

### **'Elettra' – the Floating Laboratory**

In the late 1920s and 1930s, many experiments were carried out by Marconi on board his yacht 'Elettra'. This yacht was purchased by Marconi in 1919 and was partly fitted out as a laboratory and wireless cabin. Marconi's friends were invited to go cruising and, as they enjoyed their cruise, he and his engineers worked in the laboratory, sometimes conducting experiments with shore stations hundreds of miles away. Vital h.f. – and later u.h.f. – experiments were carried out. Fig. 16 shows the



**16 Marconi's yacht 'Elettra'**



**17 Marconi in the wireless cabin of 'Elettra' in the 1920s**

'Elettra', whilst, in fig. 17, Marconi is seen on board in the wireless cabin.

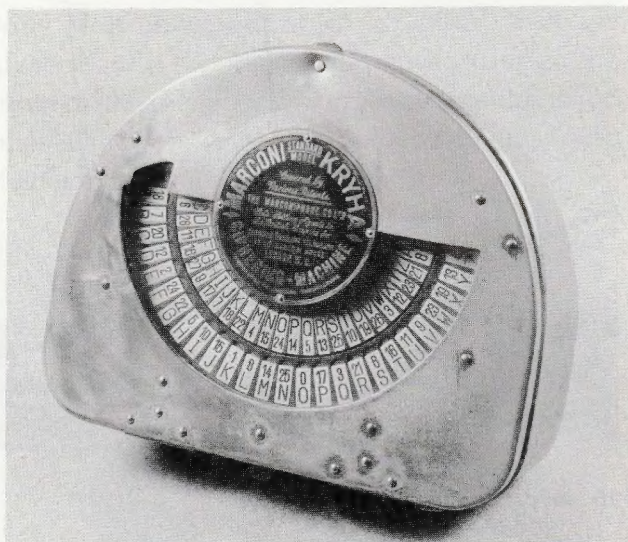
On display in the museum is a fine model of the 'Elettra' made by a former editor of the Marconi Review, Mr. L.E.Q. Walker.

### **Other Items of Interest**

An unusual unit to find amongst a collection of wireless apparatus is a 'Kryha' ciphering and deciphering machine (fig. 18). This unit was made for the commercial market and sold by the 'Marconiphone Company' during the 1920s. Whether the company made the unit, or only sold it, is not clear from our records. The machine was for use in business houses, banks and other large commercial organizations. The purpose was to ensure secrecy of communication by utilizing mechanical means for ciphering – and deciphering – documents and confidential messages.

Another unit of interest in the collection is the 'Otophone' – an aid for the deaf. This was first sold

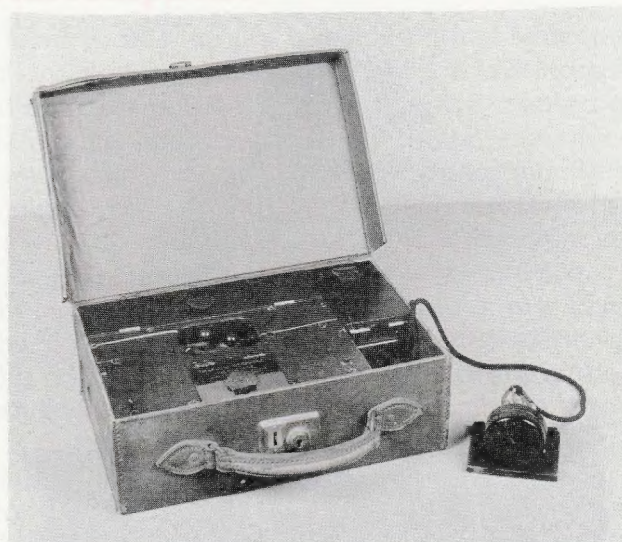




18 The 'Kryha' ciphering machine

in 1923. The unit, which is powered by batteries, has two valves, an extension ear piece, and is fitted in a small leather case (see fig. 19).

To illustrate the help which the archives have provided, the following example is given. Information about the technical construction and wiring of the T1154/R1155 was provided to a member of 460 Squadron, Royal Australian Air Force, who was restoring the radio equipment on a Lancaster bomber. The restoration was successful and the aircraft is now part of the Australian War Memorial at Canberra. Some recent visitors to the Marconi Archives from Australia have reported seeing this Lancaster, now restored to its former condition.



19 The 'Otophone' – an aid for the deaf

## Bibliography

- 1 BAKER, J.W., 'A History of the Marconi Company', Methuen, 1970.
- 2 JOLLY, W.P., 'Marconi', Constable, 1972.
- 3 MARCONI, D., 'My Father, Marconi', Muller, 1962.
- 4 VVYAN, R.N., 'Marconi and Wireless', EP Publishing, 1974.

(The Company regrets that these archives are not open to the general public. Enquiries should be addressed to the author in writing.)